

SATELLITE FLOOD FORECASTS SAVE LIVES, LIVELIHOODS IN BANGLADESH

**By Cheryl Pellerin
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WASHINGTON, AUGUST 12 -- Deadly floodwaters finally are receding in rivers of the South Asian nation of Bangladesh. The weekslong deluge killed nearly 200 people and affected 12 million in 40 of 64 districts, according to the World Health Organization, but the toll was eased by an advanced flood forecasting system developed in the United States.

Scientists at the U.S. National Center for Atmospheric Research (NCAR) and the Georgia Institute of Technology have used the system to provide forecasts to Bangladeshi agencies since 2003. But the flood warnings have not always reached the region's rural populations.

This year, the technology was combined with a network of local volunteers and people from government agencies and nongovernmental organizations who made sure the warnings reached those most at risk in five local areas called unions.

The network was established by the Thailand-based nonprofit Asia Disaster Preparedness Center (ADPC), where Ramasamy Selvaraju and A.R. Subbiah oversee the warning distribution efforts.

FAIR WARNING

Geographically, Bangladesh straddles the fertile Ganges-Brahmaputra delta, and every year torrential rains brought by monsoon winds and cyclones swell its network of rivers and canals. Some years -- most recently 1998, 2000, 2004 and 2007 -- bring special devastation that destroys crops and confounds the river dwellers' usual coping strategies.

The Flood Forecasting and Warning Centre in Bangladesh issues warnings 48 to 72 hours in advance of floods during the monsoon season, but that is not enough time to reach every river dweller, especially the million or so living in remote and vulnerable areas called river chars -- islands within the banks of the country's major rivers.

"For the first time," said Selvaraju, an ADPC climate applications research scientist, during an August 9 USINFO telephone interview from Bangladesh, "we have communicated a 10-day official forecast on significant chances of exceeding [the river's] danger level."

The 10-day lead time gave union residents time to mobilize food and safe drinking water for a week to 10 days and protect assets like seedlings, fishing nets and fish ponds.

In one union, Selvaraju added, about 35 percent of the people were evacuated in advance.

INTERNATIONAL EFFORT

The forecast system combines weather forecast models, satellite observations from NASA's Goddard Space Flight Center Laboratory for Atmospheres and the National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center, river gauges and new hydrologic modeling techniques.

Hydrology is the scientific study of water's properties, distribution and effects on the Earth's surface, in soil and rocks, and in the atmosphere.

The forecasting system is part of a larger initiative called Climate Forecast Applications of Bangladesh, established to improve flood and precipitation warnings in the low-lying nation. The initiative's principal investigator is Peter Webster of the Georgia Institute of Technology.

The U.S. Agency for International Development (USAID) has been the major supporter since 2000, but the project also has received funding from the U.S. National Science Foundation and the relief agency CARE.

"This is truly a group effort," said NCAR scientist Thomas Hopson, who with Webster developed the forecasting system.

Another contributor is the European Centre for Medium-Range Weather Forecasts, which provides data and weather forecasts that are fed into hydrological models of the Ganges and Brahmaputra river basins.

"These forecasts are very expensive," Hopson said, "but because it's a humanitarian project, they're providing them free. That helps keep the project costs fairly reasonable."

FLOOD FORECASTING

In the United States and other industrial nations, floods are forecast using river gauges to track water levels, an extensive radar network that helps forecasters determine rainfall volume and location, and computer models to predict how the water will flow downstream.

In Bangladesh, Hopson said, and in a lot of developing countries, "there really isn't radar coverage. That's why we're using this satellite data from NASA and NOAA to do the same thing."

Another problem is that Bangladesh is virtually surrounded by India, which is reluctant to share data about rivers that flow from India across the national border to Bangladesh.

Hopson, Webster and colleagues at the Georgia Institute of Technology have worked to create forecasts that go out more than 10 days. Over the next year or two, increasing numbers of Bangladeshis will begin to receive 20-day forecasts, followed by one- to six-month seasonal forecasts.

"Because the forecasting system is fully automated," Hopson said, "and the data inputs are global, I think for a fairly modest cost we can apply this technology around the world in vulnerable regions."

Hopson has discussed possible future applications for the system in Cambodia, Vietnam, Ethiopia and Ghana. And, as a scientist, he is glad that people around the world find his work useful.

"I'm proud of USAID and our government for funding projects like this," Hopson said. "In particular, this is a Muslim country and I think it's super that we have an opportunity to do something obviously constructive for this beautiful, tragic country in the post-9/11 era."

More information about Climate Forecast Applications of Bangladesh is available at the Georgia Institute of Technology (<http://cfab.eas.gatech.edu/cfab/cfab.html>) Web site.

More information about the National Center for Atmospheric Research (<http://www.ncar.ucar.edu/>) is available at the center's Web site.

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